

HEALTH AND SAFETY PROJECT PLAN
REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
INDUSTRIAL TRANSFORMER SUPERFUND SITE

Prepared for

Texas Water Commission
1700 North Congress
Austin, Texas 78711

Radian Health and Safety Manager

Radian Program Manager

Radian Project Director

TWC Project Manager

Rae Ahmed

C. R. Spencer

000419

000419

000076

2.0 TABLE OF CONTENTS

Section No.	Pages	Revision	Date
1 Title Page	1	0	October 13, 1986
2 Table of Contents Distribution List	2	0	October 13, 1986
3 Introduction	1	0	October 13, 1986
4 Field Activities	4	0	October 13, 1986
5 Job Safety Analysis	6	0	October 13, 1986
6 Training Information Health and Safety Procedures	11	0	October 13, 1986
7 Decontamination Procedures	9	0	October 13, 1986

000420

Recipients of Official copies of the Health and Safety Project Plan:

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C00421

000421

3.0 INTRODUCTION

This Health and Safety Project Plan (HSPP) describes the safety and health procedures and practices to be used while performing remedial investigation activities on the Industrial Transformers Superfund Site located in Houston, Texas.

Radian Corporation has the ultimate responsibility for the implementation of this Plan and will initiate appropriate actions to insure compliance and adequacy. The prime responsibility for employee safety will rest with: (1) Radian for its own employees, (2) Radian subcontractors for their employees and (3) with other parties whose employees will work under Radian's technical direction.

A copy of the Plan will be posted in the on-site office. All site personnel are required to become familiar with the provisions of the Plan. All Radian employees, subcontractors to Radian, and all visitors to the site are expected to follow this plan unless situations encountered in the field make changes necessary. These changes must be approved by the Project Director.

Major site activities will include the installation of monitoring wells, the drilling and sampling of soil borings, and the sampling of the groundwater, storm water, and surface soil and sediment. It is anticipated that all site field activities will be concluded within a 3-4 week time frame.

Radian, its subcontractors, and other parties participating in on-site work, will comply with all applicable requirements of 29 CFR 1910 and all other relevant regulations.

000422

4.0 FIELD ACTIVITIES

The field activities that will occur at the Industrial Transformer Superfund Site are:

- Monitor well installation,
- Soil borings, and
- Sampling activities.

4.1 KEY PERSONNEL

The personnel who will be responsible for the safe operation of this project are:

- Program Manager: R. Ahmed
- Project Director: C.L. Spencer
- Radian Health and Safety Manager: A.C. Ellis
- Supervising Geologist: D.L. Richmann
- Drilling Contractor: Southwestern Laboratories (Ray Meyer or his designated alternate)

4.2 SITE ACCESS

The following personnel are authorized to enter the Exclusion Zone:

- TWC Project Manager,
- Radian Project Director,
- Driller,
- Driller Helper,
- Supervising Geologist, and
- Site Health and Safety Officer.

000423

The following personnel are authorized to enter the project site:

- TWC Project Manager,
- Radian Program Manager,
- Radian Project Director,
- Drilling Contractor Project Manager,
- Driller,
- Driller Helper,
- Site Health and Safety Officer,
- Supervising Geologist,
- Samplers, and
- Those qualified visitors per joint agreement of the TWC Project Manager and to Radian Project Director.

4.3 PROJECT DIRECTOR RESPONSIBILITIES

The responsibilities of the Project Director with respect to safety are as follows:

- Locate support facilities in an uncontaminated area,
- Conduct a meeting of all contractor personnel and field teams prior to project start-up, to outline all safety requirements,
- Implement the site safety training program as described in this plan,
- Observe site activities to ensure the proper use of personal protective equipment,
- Ensure that work schedules, dependent on work levels and outside temperatures, are set each day and adhered to throughout the work day,
- Ensure that the field team observes the work zone and decontamination procedures,

C00424

C00425

- Ensure that safety equipment specified in the Plan is provided and is maintained in a safe manner,
- Formulate site management practices which minimize the health and safety risks to the on-site businesses and the public at large. The Project Director will meet with the on-site businesses to explain field activities and advise them how to best protect themselves from risk,
- Formulate work practices which minimize the health and safety risks to on-site personnel,
- Provide for on-site sanitation and break areas,
- Ensure that project equipment is provided and maintained in a safe manner,
- Plan and provide for implementation of corrective medical actions. This includes identification of on-site personnel who will be responsible for conducting first aide, CPR, and initiating off-site actions. This further includes prearrangement at medical facilities, providing vehicular transportation, and providing the necessary communication and transport information to implement off-site medical actions,
- Investigate, report, and correct conditions which lead to incidents, accidents, or injuries, and
- Report violation and compliance problems to the Corporate Safety Office in Austin (512-454-4797, Ext. 5763, Andrew Ellis).

4.4 DRILLING SUPERVISOR RESPONSIBILITIES

The responsibilities of the Drilling Supervisor with respect to safety are as follows:

- Ensure drilling crew compliance with the health and safety plan,
- Conduct daily, pre-work safety meetings for the purpose of evaluating experiences of the previous day, identifying specific hazards for the upcoming work day, and to highlight general safe working practices, and
- Enforcement of corrective action under the direction of the Radian Project Director. Compliance problems will be brought to the attention of the Drilling Supervisor who will be expected to immediately correct the safety problems.

4.5 CORPORATE SAFETY RESPONSIBILITIES

The responsibilities of the Radian Health and Safety Manager are as follows:

- Prepare a health and safety plan for the project,
- Inform field personnel of their rights and responsibilities. This will include an explanation of potential site risks, corporate actions to minimize those risks, and personnel actions to minimize risks,
- Provide baseline and periodic health assessment of field personnel,
- Perform a job safety analysis,
- Select appropriate personal protection equipment,
- Develop a contamination control program,
- Develop a plan to cope with anticipated emergencies,
- Establish procedures for managing weather-related problems, and
- Define decontamination procedures.

4.6 EMPLOYEE SAFETY RESPONSIBILITIES

The responsibilities of the on-site personnel are as follows:

- Become familiar with the nature of conditions at the site and of planned project activities,
- Become familiar with and comply with provisions in the Health and Safety Project Plan,
- Cooperate with project management of Plan changes, project evaluation, and incident evaluation, and
- Conduct themselves in a manner which minimizes risks to health and safety for themselves, other site personnel, and to the public at large.

000426

5.0 JOB SAFETY ANALYSIS

The tasks that will be conducted during this project will involve some exposure risk to the employee. An analysis of the hazards associated with each job is presented in the following subsections.

5.1 MONITORING WELL INSTALLATION

The installation of monitoring wells will expose the field team to the hazards listed below.

- Exposure to possible chemical contamination in ground water, drilling cuttings, and soil. Presently, the suspected contaminants are Trichloroethylene (TCE) and Polychlorinated Biphenyl (PCB). Analytical data indicate levels of these compounds, relative to the Threshold Limit Value (TLV) in air, to be low,
- Exposure to the hazard of heat stress, and
- Exposure to the physical hazards associated with drilling activities.

For the monitoring well installation, the personnel protection level will be a modified level C. Personal protection to be used during this activity is listed below:

- An HNu analyzer will be used to monitor levels of organics in the work zone during drilling,
- Tyvek coveralls (for the driller's helper when handling auger flights),
- Gauntlet style Viton gloves,
- Chemical resistant, steel toed, steel shank, safety boots, (PVC or Neoprene),
- Respirator, half-face, air purifying equipped with organic vapor cartridges and dust filters--all personnel must use eye protection with half-face respirators,
- Safety helmet (hard hat), and

000427

- Respirators, eye protection, and safety helmets must meet the specification of and the approval of MSA.

Other items may be used for supplemental protection when there is a splash hazard and during decontamination operations. Such items may include:

- Chemical splash goggles when splash hazards exist (steam cleaning especially), and
- PVC disposable gloves to be worn outside of the Viton gloves for extra protection.

5.2 SOIL BORINGS

Hollow stem auger drilling and Shelby tube sampling will occur during this phase of the field activities. These activities will expose workers to the hazards listed below:

- Exposure to chemical contamination present in drilling cuttings, soil, and water. Presently, the suspected contaminants are Trichloroethylene, and Polychlorinated Biphenyl. Analytical data indicated concentrations of these compounds to be below the TLV in air,
- Exposure to physical hazards associated with drilling activities, and
- Exposure to the hazards of heat stress.

For the soil boring activities, the personnel protection level will be modified Level C. Personal protection to be used during the activities is listed below:

- An HNu analyzer will be used to monitor levels of organics on the work zone during drilling,
- Tyvek coveralls (for the driller's helper when handling auger flights),
- Gauntlet style Viton gloves,
- Chemical resistant, steel toed, steel shank, safety boots, (PVC or Neoprene),

C00429

- Respirator, half-face air purifying equipped with organic vapor cartridges and dust filters--all personnel must use eye protection with half-face respirators,
- Safety helmet (hard hat), and
- Respirators, eye protection, and safety helmets must meet the specification of and the approval of MSA.

Other items may be used for supplemental protection, particularly when there is a splash hazard and during decontamination. Such items may include:

- Chemical splash goggles when splash hazards exist (steam cleaning especially), and
- PVC disposable gloves to be work outside of the Viton gloves for extra protection.

5.3 SAMPLING ACTIVITIES

The field sampling team will be exposed to potential chemical contact hazards during the collection of water samples from existing and newly installed monitoring wells, of surface water samples, and of sediment samples from site drainage ditches. Presently, the suspected contaminants are Trichloroethylene and Polychlorinated Biphenyl. For sampling activities, the personal protection level will be a modified Level C. Personnel protection required during these activities is listed below:

- Gauntlet style Viton gloves,
- Chemical resistant, steel toed, steel shank, safety boots, (PVC or Neoprene),
- Respirator, half-face, air purifying, equipped with organic vapor cartridges and dust filters. All personnel must use eye protection with half-face respirators,
- Safety helmet (hard hat), and
- Respirators, eye protection, and safety helmets must meet the specification of and the approval of MSA.

5.4 OTHER POTENTIAL HAZARDS

The site may contain other hazards that are not described above. The Supervising Geologist will make an assessment of the site hazards prior to starting work and ensure that the field team is protected. Two hazards which may be encountered are:

- Heat stress, and
- Drilling into underground hazards (buried drums, cylinders, electrical cables, etc.).

Heat Stress

Working in protective clothing and in Texas' climate (above 65 degrees F) can cause problems with heat stress unless proper precautions are taken. Serious medical difficulties can arise from overstressing the body when personnel are initially (first couple of days) introduced to the heat without gradual acclimatization, and/or work without adequate frequent, short rest periods. Workers will be informed of the serious dangers of the body being overstressed and how to monitor themselves and their fellow workers for symptoms of heat exhaustion and heat stroke.

To minimize heat stress risks, the following precautions will be taken:

- The Supervising Geologist will regularly monitor the ambient air temperature,
- Field team members will be observed for the following signs and symptoms of heat stress:
 - Unexplained irritability,
 - Dizziness,
 - Profuse sweating,
 - Skin color change,
 - Increased heart rate,
 - Abnormal body temperature as measured by fever detectors (forehead straps), and
 - Vision problems.

000430

000430

Any employee who exhibits any of these symptoms will be immediately removed from work zone, taken to a shaded portion of the decontamination area, and requested to consume 2-4 pints of electrolyte fluid or cool water every hour while resting in a shaded area. The worker should not return to work until symptoms are no longer recognizable. If the symptoms worsen, seek immediate medical attention.

Drilling Into Buried Hazards

During the planning/mobilization phase, the Supervising Geologist will consult with local utilities companies about the location of utility lines. If drilling cuttings indicate any signs of drums or cylinders, cease drilling immediately and close the borehole.

5.5 CHEMICAL HAZARD ANALYSIS

The field team may be potentially exposed to chemical hazards during all of the above activities. This subsection describes the chemical hazards associated with the site contaminants.

- Polychlorinated Biphenol: PCB compounds are light yellow liquids or white powders; practically odorless. They are relatively insoluble in water but soluble in organic solvents such as kerosene and toluene. It is not expected to be present in concentrated form. PCB's can affect the body by:
 - Ingestion,
 - Inhalation (as dust) and/or,
 - Skin absorption.

The primary potential exposure pathway of concern are inhalation and skin contact of PCB in drilling dust. Short-term symptoms of acute PCB exposure include:

- Dermatitis (choloracne),
- Hyperpigmentation (discoloration) of skin, mucous membranes, and nailbeds,
- Eye irritation and swelling of upper eyelid,
- Joint swelling and pain,
- Waxy secretion of eyelid glands,
- Throat irritation, and
- Yellow actrophy (liver dysfunction).

Because of the low concentration of PCB (highest 99 ppm) analyzed in soil samples, PCB concentrations in dust are expected to have airborne concentrations below 1 mg/m^3 . Thus, the personal protection equipment specified in this Plan will be sufficient to mitigate work place exposure to PCB.

- Trichloroethylene: TCE is a colorless liquid with a sweet odor. Its water solubility is 0.1 percent and is relatively volatile. It is not expected to be present in concentrated form. TCE is of concern with respect to:
 - Inhalation (of vapor),
 - Ingestion, and/or,
 - Skin absorption.

The primary potential exposure pathway of concern for TCE is inhalation of this volatile compound. The threshold limit value - time weighted average concentration for a 40-hour work week for TCE is 50 ppm. The odor threshold for TCE is 100 ppm.

For TCE exposure, the following symptoms may occur:

- Headache,
- Vertigo, and/or
- Visual disturbance.

Because the odor threshold for TCE is higher than the TLV, a HNu analyzer will be used to continuously monitor for volatile hydrocarbons during the drilling operations. If organ vapor (OV) concentrations exceed 50 ppm, immediate action will be taken to reduce the concentrations to which the workers are exposed by relocation personnel and temporary suspending operations. This emergency action will stay in affect until OV concentrations return to an acceptable level.

C00432

6.0 TRAINING INFORMATION ON HEALTH AND SAFETY PROCEDURES

- Always wear the proper personal protection as required by the safety plan,
- Always wear eye protection while working on site. Driving pins in drive chains, handling chemicals, breaking concrete, hammering or sledging, cuttings wires, grinding and/or welding are all examples of work that is hazardous to your eyes,
- Use the correct stance when lifting a heavy object,
- Watch out for slippery surfaces or objects to trip on,
- Always wear splash goggles when handling chemicals,
- Keep your clothing out of spinning rig equipment, and
- Always get treatment for even the most minor scratch or abrasion.

6.1 HEALTH AND SAFETY TRAINING

Prior to starting the work, the Project Director will conduct a training session and ensure that each field team member understands his or her safety responsibilities and hazards involved with this work.

All personnel assigned to drilling activities and water sampling efforts will be instructed regarding the potential health and safety hazards. Specifically, the following topics will be covered in the initial training session:

- Requirements for employees to work in pairs (buddy system),
- Proper materials handling,
- Preventive maintenance of safety equipment,
- Requirements for and use of respirators and personal protective equipment,
- Required personal hygiene practices,
- Heat stress,

- Effective response to any emergency,
- Responses to fires and explosions,
- Shutdown of operations,
- Emergency procedures,
- Areas of the site that have restricted access,
- Methods used for decontamination, and
- General safety precautions.

6.2 PERSONAL PROTECTIVE CLOTHING AND EQUIPMENT

Workers on site will use protective clothing and equipment to reduce or eliminate the risk of exposure to the hazards mentioned above. Workers will be trained in the proper use of such clothing and equipment before starting work. Storage for personal protective clothing and equipment will be provided at the job site.

Clothing

Protective coveralls will reduce the chances of contacting the waste material. The Tyvek coverall will provide protection against splashed and dusts. The coveralls are not to be considered "impervious" and should be quickly removed upon obvious contamination.

Gloves

The recommended glove material for use during this project is Viton.

Eye Protection

Two levels of eye protection are available for this project. Splash goggles will be used when steam cleaning equipment. Every team member will use proper safety glasses with attached side shields while on site.

000434

Respiratory Protection

The type of respirator selected for this project is a MSA half-face air purifying respirator. The cartridges to be used in these masks are organic vapor cartridges fitted with dust filters.

The respirators selected for this project will provide protection against anticipated levels of airborne gases, fumes, mists, and dusts. To ensure that the masks will perform as expected, the respirator must be inspected, fit tested, maintained, and stored properly, according to company policy and governmental regulations.

1. Inspection Procedures:

The half-face respirator should be free of dust, dirt, rips, tears, and obvious contamination. The septa should be present and in good shape. Watch for rips or dirt.

2. Fit Testing Procedures:

The first step in testing the fit you your respirator is called the negative pressure test. Block the inhalation valves (on the side of the mask) with the hands or plastic sheets and inhale slightly. You should feel the mask draw in on the face. Watch for air leakage around the face-piece indicating a poor facial fit. REMEMBER, FACIAL HAIR THAT INTERFERES WITH THE FIT OF THE MASK IS PROHIBITED.

The next test (positive pressure test) is done by blocking the exhalation valve (at the bottom of the mask) with the palm of your hand. Exhale gently and notice for air leaking round the face-piece of the mask, indicating a poor fit. If air is leaking our of the mask, re-tighten the straps and perform the negative and positive pressure tests again.

C00435

The last test (qualitative testing) involves the use of an indicating odor that is passed around the mask fitted with ORGANIC VAPOR CARTRIDGES. The employee will be asked to position his or her head to the side, up and down to simulate normal working conditions. The detection of the odor indicates that the facial seal of the mask is inadequate. If the employee detects the smell, the trainer is allowed to tighten the straps and adjust the masks on the employee one time. If the odor test is unsuccessful twice, another brand of mask should be fitted.

3. Maintenance of Respirators:

Respirators will be maintained to ensure that they work properly. Replace any missing part of the mask or strap, clean the mask with hot soapy water after each use, and do not let others wear your mask without disinfection first.

4. Storage of Respirators:

Respirators must be stored in a clean, safe, and dry environment (e.g., not near the working area or on the drilling rigs).

5. Use and Limitations of Respirators:

Respirators selected for this project should be used properly and within the limits for which they were designed. These air purifying respirators will be useful in concentrations well below the 1000ppm filtration limit of the cartridges. These masks do not provide oxygen and should not be used in confined spaces or oxygen deficient atmospheres.

C00436

6.3 PERSONAL HYGIENE

Administrative procedures require hygienic practices consistent with work hazards. Signs will be posted at the site indicating various hazards and that unauthorized entry is prohibited. Working areas will be posted with information related to personal hygiene activities required of employees to enter specific areas.

Eating and food preparation or dispensing will be prohibited in any area other than those designated and properly protected. No food or beverages will be permitted in the work area, including items such as candy, gum, snuff, and chewing tobacco.

Employees who handle contaminated soil or articles must wash their hands with soap or mild detergent and water before they are permitted to enter the eating areas. To avoid potential hand-to-mouth contamination, smoking or chewing tobacco will be permitted only in designated areas. The site health and Safety Officer will perform inspections and document variations. Violators will be asked to leave the job site.

6.4 DECONTAMINATION AND WORK ZONE PROCEDURES

Items that become contaminated must be cleaned up to prevent employee exposure and the spread of harmful materials. The field team will also be expected to establish work zones and comply with safety procedures and dress codes for each particular zone.

Section 7.0 gives a description of the decontamination procedures that will be used for this project. The following information will be given to the field team:

- Work zone definition and marking,
- Dress codes for each work zone, and
- Decontamination procedures for personnel, equipment, and heavy equipment.

000437

Exclusion Zone

The exclusion zone is the area immediately surrounding the work area where the waste is being disturbed. For monitor well installation and deep soil boring, the exclusion zone will comprise a circle extending 25 feet around the drilling rig. Proper personal protection consists of hand, foot, eye, respiratory, body, and head protection as listed in Sections 5.1 and 5.2.

Contamination Reduction Zone (CRZ)

The contamination reduction zone is the area where decontamination will occur. The idea is to have personnel remove contaminants from themselves and their equipment inside the CRZ. This practice will avoid the spread of contamination into the support area.

Support Zone

The support zone is intended as an area that remains free of contamination and is used for staging activities, breaks, and eating. It is extremely important to keep this area clean and free of contamination. Never bring contaminated equipment, articles or yourself into this area without going through the decontamination procedures first.

Decontamination Procedures

Personnel and equipment can become contaminated in a number of ways including:

- Contacting vapors, gases, mists, or particulates in the air,
- Being splashed by materials while sampling or opening containers,
- Walking through puddles of liquids of on contaminated soil, and
- Using contaminated instruments or equipment.

000438

Protective clothing and respirators help prevent the wearer from becoming contaminated or inhaling contaminants. Good work practices help reduce contamination of protective clothing, instruments, and equipment. The following field practices will minimize the contamination potential for site personnel and equipment:

- Do not enter a contaminated area unless it is necessary to carry out a specific job,
- When in a contaminated area, avoid touching anything unnecessarily,
- Walk around pools of liquids, discolored areas, or any area that shows evidence of possible contamination,
- Do not sit or lean against anything in a contaminated area. In cases where you have to kneel (e.g., to take samples) use a plastic ground sheet,
- Walk upwind of contamination, if possible,
- If at all possible, avoid setting sampling equipment on contaminated areas. Place equipment on a protective cover such as a plastic ground sheet, and
- Know the limitations of all protective equipment being used.

The employee needs to be aware of donning and doffing procedures for protective clothing and equipment. These procedures are easy to follow:

- Gloves go on your hands first when putting protective clothing on, and
- Gloves come off your hands last when undressing.

These procedures will be supplemented by performing decontamination on personnel, equipment, and heavy equipment. Decontamination procedures consist of physically removing contaminants with hot, pressure-water wash cleaning equipment for equipment and detergent washing for personnel.

000439

The drilling rigs and soil coring equipment will be cleaned with high-pressure hot water to remove any contamination.

Respirators should be washed with detergent/disinfection solution to remove any contamination. Respirators must be washed at the end of each day or more often if they become grossly contaminated.

6.5 EMERGENCY PROCEDURES

Emergency procedures listed in this plan are designed to give the field team instructions in handling medical emergencies, fires, and explosions.

6.5.1 GENERAL

All accidents and unusual events will be dealt with in a manner to minimize continued health risk of site workers. In the event that an accident or other unusual event occurs, the following procedure will be followed:

- First aid or other appropriate initial action will be administered by those closest to the accident/event. This assistance will be conducted in a manner to assure that those rendering assistance are not placed in a situation of unacceptable risk. There will always be someone on the work site who has had Red Cross first aid and CPR training.
- All accidents/unusual events must be reported to the Site Health and Safety Officer and the Project Director. The Site Health and Safety Officer is responsible for conducting the emergency response in an efficient, rapid, and safe manner. The Site Health and Safety Officer will decide if off-site assistance and/or medical treatment is required and arrange for assistance.
- All workers on site are responsible to conduct themselves in a mature, calm manner in the event of an accident/unusual event. All personnel must conduct themselves in manner to avoid spreading the danger to themselves and to surrounding workers.

The following emergency equipment will be available at the site:

- First aid kit,
- Fire extinguisher and blanket, and
- Emergency eyewash station.

000440-000440

6.5.2 RESPONSE TO SPECIFIC SITUATIONS

Emergency procedures for specific situations are given in the following paragraphs.

Worker Injury

If an employee working in a contaminated area is physically injured, Red Cross first aid procedures will be followed. Depending on the severity of the injury, emergency medical response may be sought. If the employee can be moved, he will be taken to the edge of the work area (on a stretcher, if needed) where contaminated clothing will be removed, emergency first aid administered, and transportation to a local emergency medical facility awaited.

If the injury to the worker is chemical in nature (e.g., overexposure), the following first aid procedures are to be instituted:

- Eye Exposure - If contaminated solids or liquids get into the eyes, wash eyes immediately at the emergency eyewash station using large amounts of water and lifting the lower and upper lids occasionally. Obtain medical attention immediately. Contact lenses should not be worn when working on the site.
- Skin Exposure - If contaminated solids or liquids get on the skin, promptly wash the contaminated skin using soap or mild detergent and water. If solid or liquid phenol or liquids containing phenol penetrate through the clothing, remove the clothing immediately and wash the skin using soap or mild detergent and water. Obtain medical attention immediately when exposed to concentrated solids or liquids. Wash face and hands prior to eating or leaving the site.
- Breathing - If a person breathes in large amounts of contaminants move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Obtain medical attention as soon as possible.
- Swallowing - When contaminated solids or liquids have been swallowed and the person is conscious, give the person large quantities of water immediately. After the water has been swallowed, try to get the person to vomit by having him touch the back of his throat with his finger. Obtain medical attention immediately.

000441

Fires

Fire extinguishers will be provided with the drilling equipment. If a localized fire breaks out, chemical fire extinguishers will be used to bring the occurrence under control. if necessary and feasible, a fire blanket, soil, or other inert materials will be placed on the burning area to extinguish the flames and minimize the potential for spreading. if appropriate, local fire-fighting authorities will be contacted for notification and/or assistance.

If an uncontrolled fire develops releasing potentially toxic gases, persons in the immediate vicinity will be evacuated. Only personnel trained in fire fighting and outfitted with proper protective equipment will be allowed in the immediate fire area. The Project Director or Site Health and Safety Officer will alert local fire-fighting companies.

Unusual Objects

Although highly unlikely, unusual objects (e.g., gas cylinders, bulging drums, fuming containers) could be encountered during boring and sampling operations. When such objects are encountered, the Supervising geologist will halt operations and notify the Site Health and Safety Officer and Project Director. The Project Director will contact the TWC Project Manager to decide on the next course of action.

Evacuation Plan

Although very unlikely, it is possible that a site emergency could necessitate evacuating all personnel from the work site. If such a situation arises, the Site Health and Safety officer will notify the Project Director or vice versa of this event and the appropriate signal given for site evacuation. The Site Health and Safety Officer or the Project Director will notify the on site businesses of the emergency. It is the responsibility of these individuals to evacuate personnel in a calm, controlled fashion.

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All available vehicles located outside of the work zone will be used in the evacuation. All personnel will exit the site and be taken to a rendezvous point selected by the Site Health and Safety Officer depending on wind direction, severity and type of incident, etc. The evacuation routes will be via Mansard Road to Knight Street to the west or South David Street to the west.

The on-site personnel log book will be used to ensure that all individuals are accounted for.

Emergency Response Procedures

In the event of an onsite emergency requiring notification of off-site personnel, the Project Director or Site Safety and Health Officer are responsible for immediately notifying the agencies and personnel listed below. As soon as possible, the TWC Project Manager will be apprised of the emergency situation.

The event of a fire, explosion, or any occurrence that might be damaging personnel or adjacent property will require the immediate notification of the proper emergency service. The proper emergency service is determined by the nature of the emergency.

EMERGENCY OR DISASTER NOTIFICATION CHECKLIST

Fire Department.....	227-2323
Ambulance.....	222-3434
Poison Control.....	654-1701
Police.....	222-3131
Hospital.....	790-2245

000443

7.0 DECONTAMINATION PROCEDURES

To minimize the transfer of hazardous substances from the site, contamination control procedures are needed. Contaminants must be removed from people and equipment prior to relocation from exclusion zone and contamination reduction zone to the support zone. The location of the decontamination pad is presented in Figure 7-1.

7.1 WORK ZONES

The field team will prevent waste material from moving from the drilling site. The team will prevent migration of site contaminants by using work zones to control the spread of contamination. Decontamination procedures will also help reduce the chances of spreading contaminants.

Exclusion Zone

A 25 foot circle around the drilling site will be defined before drilling starts. The circle will constitute the "Exclusion zone". This zone may contain potentially hazardous air borne and physical hazards to the workers. Full personal protection will be required in this area. This protection is described in Section 5.0 of this plan. There will be no eating, drinking, smoking, or the chewing of tobacco products or gum in the Exclusion Zone. This restriction includes having any food, drink, or tobacco products on an individuals person. Entry into the Exclusion Zone will be limited to those who have a need to be in the area. A list of authorized individuals is included in Section 4.2.

Contamination Reduction Zone (CRZ)

A corridor leading from the Exclusion Zone to the CRZ will be defined. This corridor should lead from the drilling rig to the decontamination area. All decontamination activities will occur in this area.

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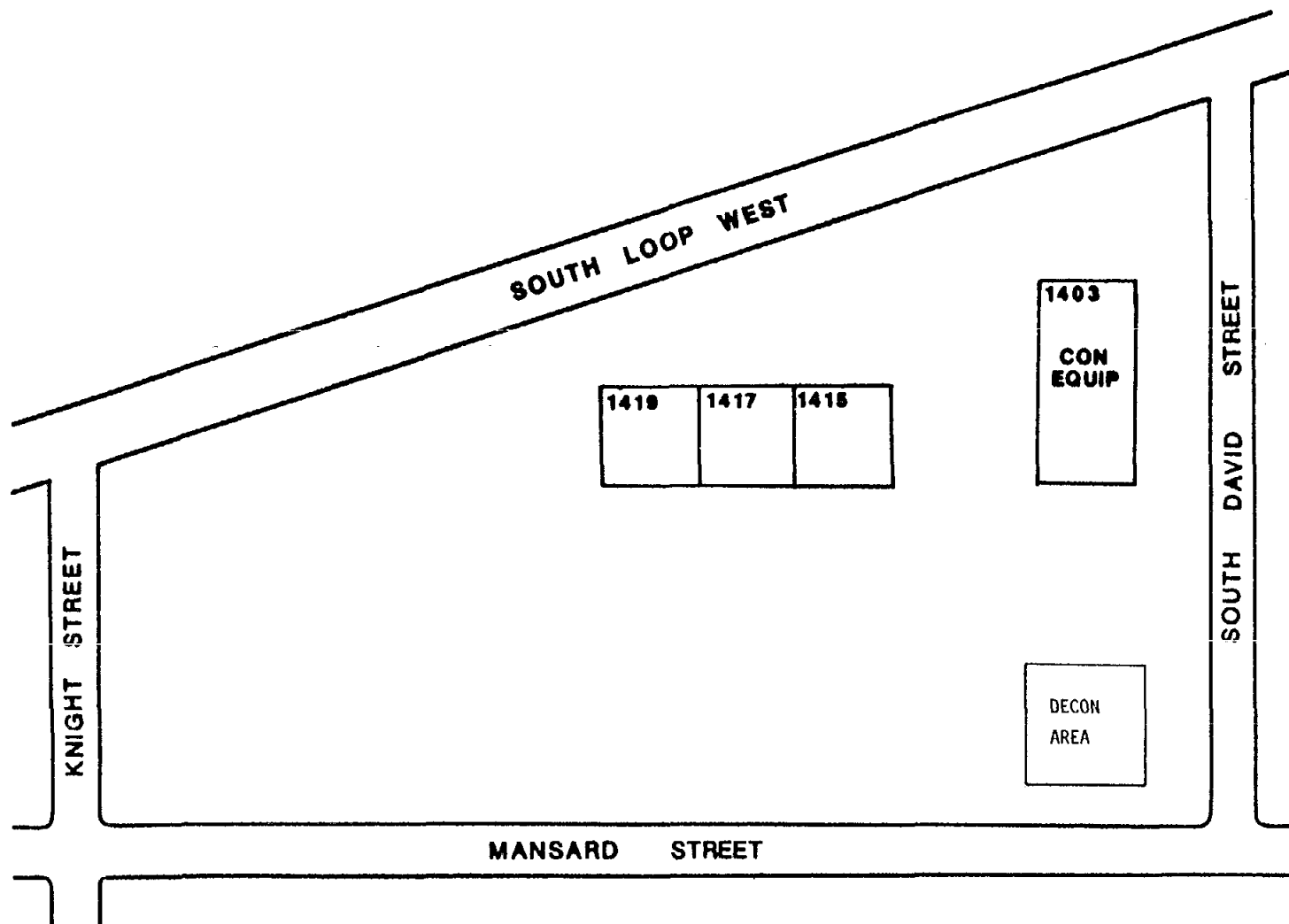


Figure 7-1 Location of Decontamination Area

Section No. 7
Revision No. 0
October 13, 1986
Page 2 of 9

The facility will be constructed with an impermeable pad with curbing. Water wash stations for personnel and equipment will be provided. Washing supplies and equipment such as brushes, brooms, detergents, and solvent will be housed at the pad.

There will be no eating, drinking, smoking, or the chewing of tobacco products or gum in the CRZ. This restriction includes having any food, drink, or tobacco product on an individuals person.

Support zone

A support zone must be defined for each field activity. The zone should be at least 50 feet from the drilling rig and should be clean and free of contamination (surface and airborne).

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7.2 PERSONAL EQUIPMENT DECONTAMINATION

Decontamination of site work crews will be accomplished in a decontamination area located at a spot indicated on Figure 7-1. The decontamination area will provide a controlled washing system design to avoid transfer of chemical contaminants from protective clothing to the skin. Figure 7-2 schematically represents the proposed layout of the Contamination Reduction Zone (Decontamination Pad). Table 7-1 presents procedures for personal equipment decontamination and Figure 7-3 shows the layout.

Following is an explanation of the procedures, equipment, and location of each station identified in the expanded personal equipment decontamination system outlined in Table 7-1 and Figure 7-3.

Station A

All monitoring and sampling equipment must be decontaminated in the equipment decontamination area under supervised conditions. Equipment will be dropped at Station A, just inside the Contamination Reduction Zone (Decontamination Pad). All disposable covers removed from the equipment must be placed in the proper disposal barrel.

Station B

All boot covers and Tyvek coveralls (where applicable) are removed and placed in an appropriate receptacle for later disposal.

Station C

Gloves are washed at this stations with soapy water. The soapy water is contained for ultimate disposal.

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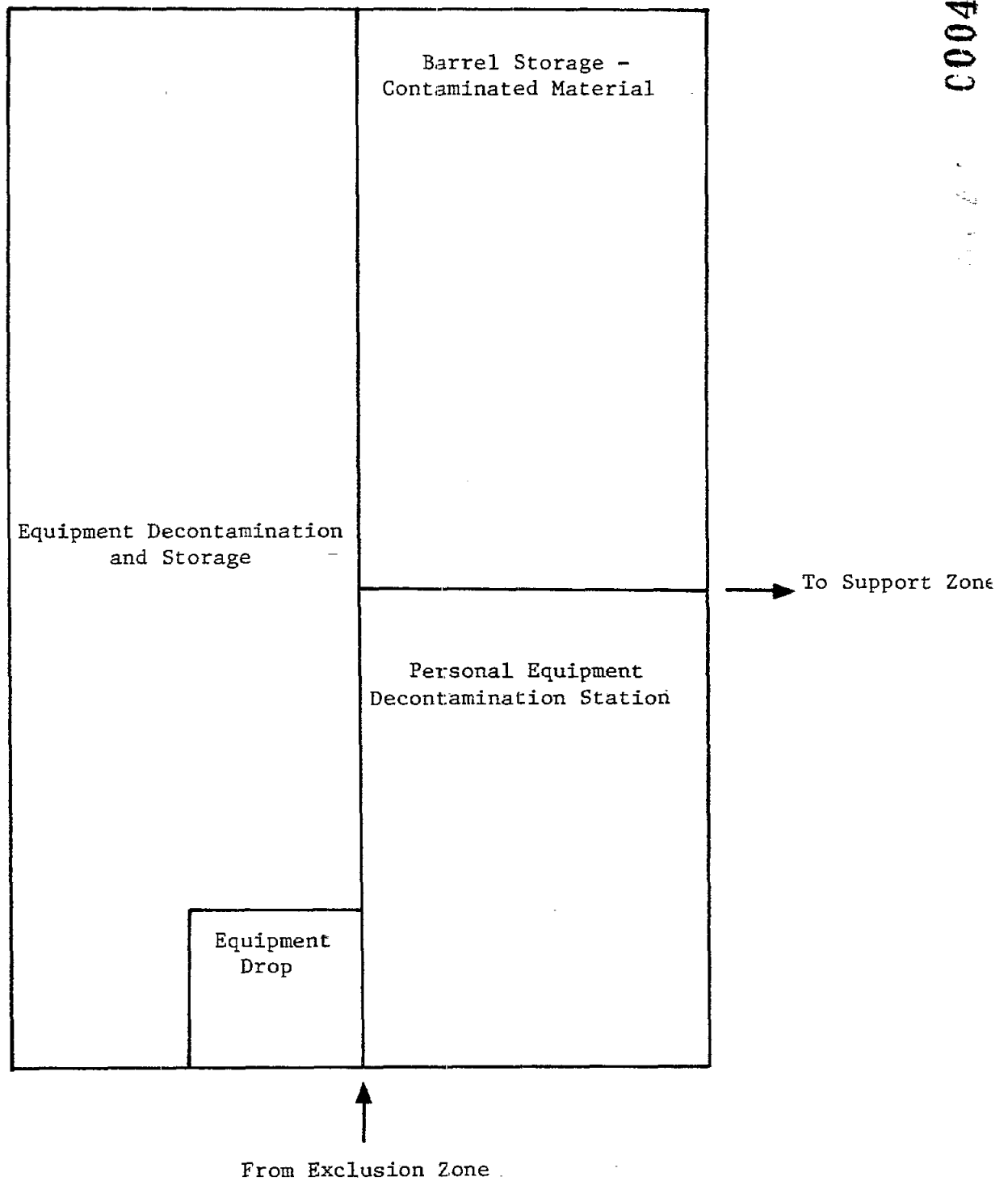


Figure 7-2 Contamination Reduction Zone

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Table 7-1. Personal Equipment Decontamination Procedures

The layout of the PEDS is shown in Figure 7-3 and is as follows:

Station A - A plastic ground sheet on which field equipment is dropped by returning members of the work crew.

Station B - A stool for personnel to sit on during removal of boots and Tyvex coveralls.

- A plastic lined container where disposable boot covers and coveralls are discarded.

Station C - A 10-gallon bucket filled with soapy water.

Station D - A 10-gallon bucket billed with rinse water.

Station E - A 10-gallon bucket filled with soapy water.

Station F - A 10-gallon bucket filled with rinse water.

- A small table with a bottle of alcohol and clean rags to wipe out the inside area of respirators.
- A plastic lined container for disposal of wiper rags.

Station G - A 10-gallon bucket filled with soapy water.

Station H - A 10-gallon bucket filled with rinse water.

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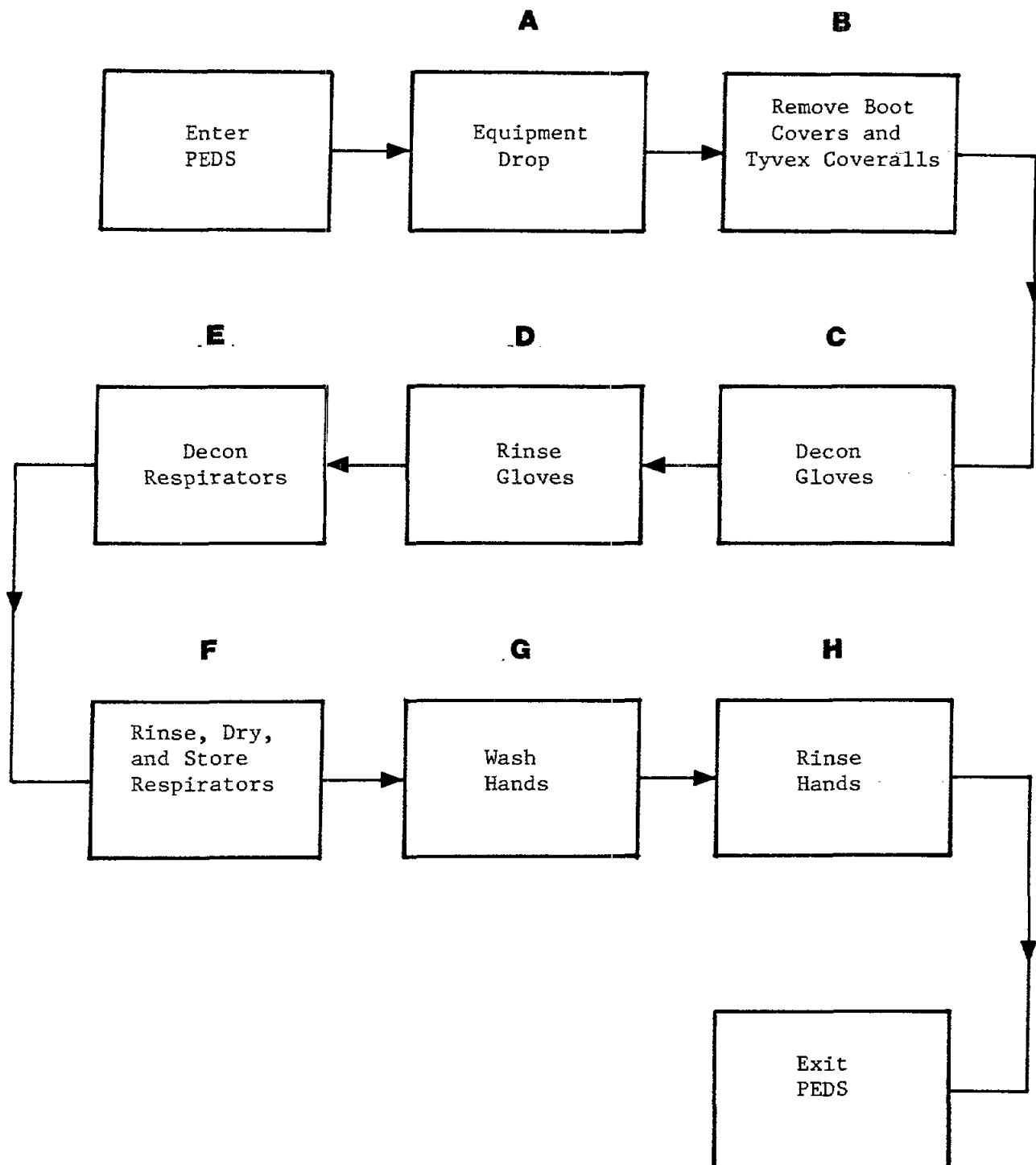


Figure 7-3 Personal Equipment Decontamination Station Layout

Station D

Next, the soaped-up gloves are rinsed in water and removed. The gloves are hung to dry. The water is contained for ultimate disposal.

Station E

The respirator is removed and its outer surface washed with soapy water. The soapy water is contained for ultimate disposal.

Station F

The soaped respirator is rinsed in water and the inside wiped with a clean rag and alcohol. Once cleaned, the respirator is stored in a clean dry place. Once again the water is contained for ultimate disposal.

Station G

Each member of the work crew will wash his/her hands in soapy water. The soapy water will be contained for ultimate disposal.

Station H

Each member of the work crew will rinse his/her hands in the rinse water and dry then on paper towels. The rinse water and used paper towels will be contained for ultimate disposal.

Each member of a work crew must follow these decontamination procedures when leaving the work site for any reason.

Each person having been exposed to possible contamination in the Exclusion Zone or Contamination Reduction Zone should bath at home each evening.

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7.3 EQUIPMENT DECONTAMINATION

Equipment contacting contaminated soil, sludge or water will be thoroughly cleaned at the pad. The equipment wash sequence will consist of a soap and water wash and water rinse repeatedly until cleanliness is obtained as determined by inspection. All times will be inspected by the user/operator and Site Health and Safety Officer. Equipment that cannot be cleaned will be properly disposed. Spent wash water will be drained to a sump and pumped to storage containers for subsequent disposal. Solids will be washed down and scrapped from the pad, curbing, and sump and stored in drums for disposal.

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June 27, 1986
Feasibility Study
Radian Proposal No. 278-584-6-144

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LABOR ESCALATION FACTOR

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Labor classification rates are current-average hourly rates as of January 1, 1986.

An escalation factor has been added to cover the cost of anticipated general salary increases. Radian anticipates making general salary adjustments for all employees on January 1 each year, thus the direct labor has been escalated by a factor for each twelve month period beyond January 1 to account for these general salary increases.

Our estimate of future labor cost increases is:

Year	Incr From Prev Year	Cumulative Escalation Factor
1986		1.000
1987	5.0%	1.050
1988	5.0%	1.103
1989	5.0%	1.158
1990	5.0%	1.216
1991	5.0%	1.277

Estimated Period of Performance
01-Dec-86 to 30-Apr-87

01-Dec-86 to 31-Dec-86	1 / 5	X	1.000 =	0.200
01-Jan-87 to 30-Apr-87	4 / 5	X	1.050 =	0.840
				1.040
				=====

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